

AVIATION

The Oldest American Aeronautical Magazine

MARCH 2, 1929

Issued Weekly

PRICE 20 CENTS



Comdr. E. E. Wilson aloft in a "Wasp" powered Boeing F3B fighter.

VOLUME
XXVI

Special Features

The Todd Monoplane
Watercooled Aircraft Engines
Activities of the Aero Chamber of Commerce

NUMBER
9

AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

Entered as second class matter July 27, 1928, at the post office at New York, N. Y., under the
act of March 3, 1879. Yearly subscription rates: Domestic, \$4; Canada, \$5. All other countries, \$6.

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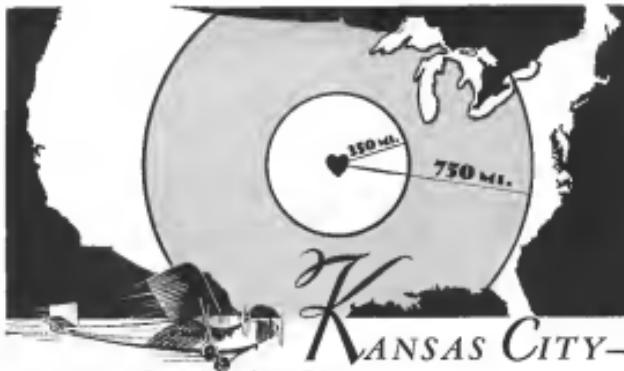
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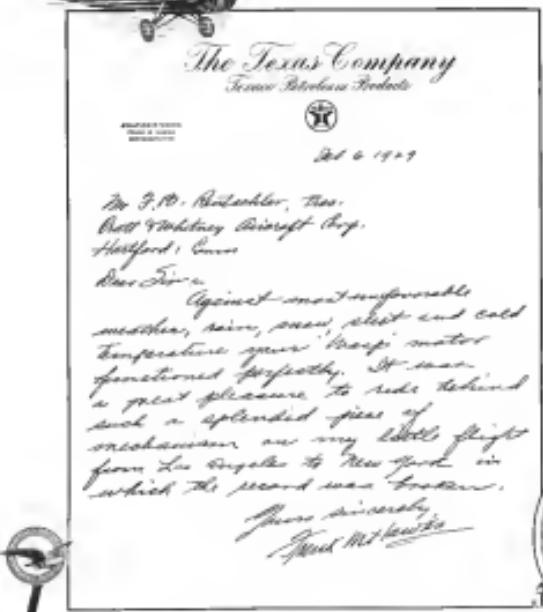
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It's now eighteen hours, twenty-one minutes, fifty-six seconds from Los Angeles to New York as the "Wasp" spends the 2,700 miles in new records in the nonstop continental nonstop race. Setting a new pace, THE PRATT & WHITNEY AIRCRAFT CO.

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PROGRESS quietly made in the aeronautical laboratories the day is sometimes as rapid as that made monthly later in the year.

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Thousands of aeronautic products have been tested in the Goodrich laboratories, but only forty have been approved as worthy of the Goodrich name.

Among them are the famous Goodrich Streamline Wind

Shield, Airplane Tire-and-Tab combination that Lattingh flew across the Atlantic on the Spirit of St. Louis; Goodrich non-skid tires; and Goodyear sprayed shock absorber cord.

Now a new Goodrich sponge rubber tail wheel is being marketed that permits you to handle your plane on the ground much as you would your automobile in your own back yard.

And in Goodrich laboratories today you will see similar other materials being developed into tested aviation products of tomorrow.

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Goodrich *Rubber for Airplanes* •••

TABLE 108. *Age structure of students*

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that speed the flight of



... that flight may be more enduringly beautiful

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Air-mail chemists in the du Pont laboratory quickly realized and met these new demands. Du Pont aircraft finishes were instantly recognized as unique achievements. Wing dope, body finishes, varnishes, varathene, brought in new, enduring beauty to aircraft, withstood the most rigorous

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The new style of travel also demanded a variety of different techniques of color variability. Hard in hard, with optical and certain expenses, du Pont Color Advisory Service developed a completely new line of shades and tints that perfectly meet your requirements for mobility.

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brity were not enough. The modern needs of travel called style treatments that would set your ships apart. Du Pont Color Advisory Service brought to the aircraft market the style genius of two cosmetics. New beauty, new distinction, new characteristics, the shape of leading makes.

Let us assist you in developing new finishing techniques.

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Du Pont Dope—The du Pont line of aircraft finishing materials includes also, among many others, Du Pont Varnishes, Du Pont Paints, and numerous kinds of remarkable flexible finishes in varathene as well as on the laboratory. Flexible and lighter finish resources, the Army and the Navy have found in Du Pont products the ones required. Available in a wide variety of highly durable colors.

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MODERN as the new world of the air travel itself, three new du Pont materials—Tyrene and Fibre-Kord. Demand by these very materials. Demand by these very materials.

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Newburgh, New York

plane fabrics for cabin ships, padding the burlap, burlap, and gauze of the modern mode of travel.

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DU FORT FIBERGLASS—Flexible Fiberglas is an ideal material for open cockpit upholstery. Will withstand all weather conditions. No moisture, no mildew, no rot. No sagging. No stretching. No cracking. Made in a variety of colors, including white, cream, light beige, tan, and cream with appropriate pattern colors. Embroidered in classic pattern.

DU FORT TYRENE—A strong, durable, light, unbreakable, transparent material, formed in its shape from pieces joined or clashed approximately six to a square in. Ideal for windshields, cabin windows, covering lights and other uses.

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17-year-old girl sets flight mark using Kendall Penzbest Oil



KAREN SMITH
17 YEARS OLD
BIRMINGHAM, ALA.



February 1, 1928

Kendall Penzbest Oil
Bradford,
Pennsylvania

Dear Sirs: Attention Mr. J. R. Dawson

We doubt you will be glad to learn that I used Kendall Penzbest oil in my flight yesterday and today I established a solo endurance record of 20 hours.

In this flight as well as many others I have made, including an altitude record, I have used your oil with the most satisfactory results. The weather was unusually bad yesterday, but I used your oil and I am sure that I could not have done it without your assistance.

It does not seem to make any difference if the weather is hot or cold or even all around you would like to think it is. I am sure you will be surprised when I tell you that I am without any difficulty when it is 40°.

There is especially a feeling of satisfaction when I know that Kendall is in my engine and it has helped me accomplish such things that aviation is just as safe for women as it is for men.

Very truly yours,

Karen Smith



KAREN SMITH says Kendall Penzbest helps to make aviation safe for women

Fighting bitter cold and high winds over Long Island for 15 hours, 16 minutes, 45 seconds, Karen Smith of Birmingham, Alabama, established the world's endurance record for women, with a solo flight which she completed from her Kenneray Model Ford biplane after landing at Mitchell Field at 10:30 a.m. on January 31, 1928.

This plucky girl who also achieved a woman's altitude record in August of last year, greatly exceeded the endurance record previously set by the pair piloted by Kendall Penzbest Oil in helping to make her flight a success. In expressing her opinion of Kendall Penzbest, Miss Smith does an unusual about the oil, "I used your oil in my engine and it consistently throughout her flight kept her aircraft in a pitch.

The superior quality of Kendall Goods of Pennsylvania crude from which Kendall Penzbest is manufactured, the thorough treatment given to the oil, the care with which it is stored in its shipping, the care with which it is handled the moment the engine is started and its effectiveness in high temperature temperatures, distinguishes the performance to insure safety and efficiency of operating aircraft.

Kendall Penzbest Oil commands the choice of women plane manufacturers. It is helping to make women safe for women — safe for all. For a list of importers where Kendall Penzbest is sold, address the Kendall Refining Company, Bradford, Pa.

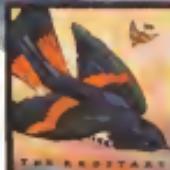
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The colorful Biplane helped the working on this Stinson
Biplane color banner is reflected with its standard Stinson
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The AVIATION MARKET

Where it is, what it is, and WHY . . .



Predictions indicate that there will be more airplanes produced in this country during 1939 than ever before. There will be pilots—people qualified to fly them. Thus, aviation presents a marketing problem, the solution of which is quite obviously . . . the training of more pilots.



Distributors and dealers who Understand . . .

For the distributor and the dealer who understand the aviation market . . . **AVIATION**, there is an opportunity to make 1939 a most lucrative year. Because, the major market of aviation is unquestionably flying instruction . . . flying schools . . . and, the right place for that particular purpose.



Superior gliding qualities and an unusual maneuverability, will glide interchangeably at lower speeds than any other type of plane in existence today. Equipped with a forty horsepower Siemens engine, an AKL-25 will carry two people one hundred miles on less than four gallons of fuel. Compare this economy of operation with that of planes now used for flying instruction.

* * *

If no other qualification were considered in the selection of an airplane for training purposes, the simplicity of the construction in the AKL-25 would be your approval, for, there are no wires in shock, and all parts are interchangeable. The easier place can be dismantled and assembled by two men in a short time. The flying school is a necessity, and insurance is consequently at an minimum. With the weight spread ready for flight or detached for storage, the weight of an AKL-25 is so distributed that one person can now it with ease. As for performance, one demonstration will convince you beyond any possible doubt.

* * *

As a solution to this problem, we offer to commercial aviation a simple, safe, and proven model . . . the Aeromarine Klemm AKL-25, known throughout Europe at the Klemm monoplane. In Germany, Switzerland, Norway, Sweden, Denmark, France, Italy, South America and South Africa, it is used extensively for training purposes.

* * *

The engineering principles embodied in the AKL-25 enable it to take off and to land in the smallest and roughest of fields. Due to an



To train pilots, however, there must be more planes than flying schools, which are mainly located in the areas that have the greatest number of prospects. And, there must be a type of training plane, which, by design, construction and proven performance, will stand the test of flying instruction . . . safely and economically.



As a solution to this problem, we offer to commercial aviation a simple, safe, and proven model . . . the Aeromarine Klemm AKL-25, known throughout Europe at the Klemm monoplane. In Germany, Switzerland, Norway, Sweden, Denmark, France, Italy, South America and South Africa, it is used extensively for training purposes.



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110 H.P.
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1939 Series are regard.*

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Detroit - Michigan
U. S. A.

THANK YOU for visiting AVIATION

The New-Day Plane is Ready!

The Barling NB3 has taken its place in the sky!

This announcement, so eagerly awaited by the aeronautical world, culminates fourteen years of intensive study and exhaustive experiment by Walter H. Barling, internationally known engineer.

Competent aviators pronounce the Barling NB3 years in advance of any other aircraft now marketed. It is truly a New-Day Plane!

The structure of the Barling NB3 is the safest and least subject to failure of any airplane now made. Fundamentally sound dynamic principles, the advanced shell-type box-spar all-metal wing, utter simplicity—these are but a few of the ingenious features engineered into this monoplane.

The Barling NB3 will make its official debut at the Detroit Show. In the meantime, distributor contracts are still available in several sections of the United States.

Watch for announcement of specifications and performance records next month.

NICHOLAS-BEAZLEY AIRPLANE CO., INC.
Manufacturing Division
MARSHALL, MISSOURI



BARLING NB3

Mon  *plane*



Vol. XXVI

MARCH 2, 1929

No. 9

The Ideal Sport Plane

THE staff of *AVIATION* has been giving serious consideration to the creation of a sport plane which the aviator could use for cross country trips and business purposes. They have discussed the matter among themselves and with other plane experts; they have flown with anyone who has claimed them a mile and have even gone so far as to pay for a flight. Each one of the five men on the staff has supplied his ideas and the results are really strikingly comprehensive in their suggestions for the ideal sport plane. It is thought these ideas might be useful in recommendations of sport planes at indicating the demands of prospective purchasers. It should have the high speed of a Lockheed Vega, the slow landing speed of an Avro and the quick take off of a Waco 9 powered with a Whittlesey engine. It must have the maneuverability of a Curtis pursuit, the inherent stability and the speed qualities claimed for an Avro 504 and the useful life of a J-3. It should be as economical and reliable as possible, seating two people, it should have an extreme feature which would give it the carrying capacity of a Ford transport. The forward and down stability should be similar to that in the early types of Curtis pusher planes and, of course, visibility to the rear must be subordinated. The engine should be of low power and, for the sake of simplicity, should not have more than four cylinders—preferably it should be a Doherty.

If these specifications are complied with, the staff of *AVIATION* feels sure that the plane will meet with a ready market. Lastly, but not least, the plane should not cost more than two thousand dollars.

In Retrospect

THE New York Show was a marked success both from the point of view of the interest it aroused and also from the comments made with an air of being positive. It certainly consolidated both Detroit and Chicago in importance and many seemed to believe that it had been equally successful in the matter of direct sales to users. Such a success for an unchartered show seems to have been a surprise to many in the industry.

This reflects the fact that it has been the latest, swift, easy to emphasize, the diffusion of flying in the East, and of playing up the West. At the same time, the general opinion of our western and middle western country are valid, but it must not be forgotten that the enormous population and the great unchartered wealth of the Eastern states give them many advantages. The proportionate number of people who have the urge to fly is probably fairly equal throughout the country.

It has been pointed out that eastern airports are far

from the cities. This is true but it is also true that they are often in close proximity to the subtropical homes of some of the wealthiest people in the world. Much of the East does not make good landing country, but after all, most airplanes land on airports and eastern airports are close together. New York for example has over a dozen in its immediate vicinity, and Philadelphia has ten. There are many more people traveling than there are on the western prairies. Also the automobile roads in the East are more organized, especially on Sundays and holidays that the western roads is often a very slow and tedious way of getting about. As in the East, not being as isolated as is usually the case. The eastern aeroplane have green enormous amounts of space to aeronautical news and the leading papers carry aeronautical sections in their Sunday editions. The eastern aeroplane is more reliable and inexpensive and has a great educational effect. The great rise in aeronautical stocks on the New York market has also probably done its bit in getting people reading in the East interested in the business of flying.

In spite of its admitted hardships the East is a very large and concentrated market for airmen and the industry should not ignore it in its future show programs.

Gliding and Soaring

THE Germans who have gone farther than any one in aeronautics in the world make a very sharp distinction between gliding and soaring. Gliding is the art of flying through the air from a higher to a lower point. Soaring is setting out a wing air current so that the flier rises to a point higher than his starting point. In practice this differentiation is very real. The machines best for gliding are extremely simple and rugged in their construction and are arranged to make them aerodynamically efficient. Unless they are launched by a cliff or in very strong air winds they can not rise very far above the ground and the flight of the machine is a mere short distance. The soaring machine is extremely delicate in its construction, it can rise to great heights and it is an extremely difficult matter to fly them well, and takes a well trained pilot to fly them at all.

Aviation has been slow in realizing the necessity for the distinction between the two types. Gliding, done under proper guidance and with some distinction, is a safe, economical and sensible way to learn how to fly. Soaring, on the other hand, is a difficult art which could teach the aviator to fly with a glider, and preferred that they went at it closely and started from the level or a very slight slope, they could do it with comparative safety. A soaring machine, which though really only a very efficient glider, is not at all suitable for training. A student would not think of starting his training on a Pfeiffer motor, nor should he start his gliding instead of flying in a soaring machine.

AVIATION, Now a McGraw-Hill Publication, Enters an Era of Greater Service

THE publisher of AVIATION announces what is perhaps the most significant and far-reaching step in the history of aeronautical journalism. Spurred by the many opportunities and problems facing the aviation industry, and determined that AVIATION shall continue to make the greatest possible contribution to its progress, the Aviation Publishing Corp. has joined forces with the McGraw-Hill Publishing Co., the largest business publishing organization in the world.

Therefore, with the issue of March 9, AVIATION will appear under McGraw-Hill ownership. It will be edited and managed by the same personnel which has served it so well in the past. But it will be strengthened by the greater resources and facilities afforded by this well known editorial institution. It will make possible a broader and more helpful service to our readers. It will assure our ability to keep pace with the ever-increasing development of this great industry and maintain the highest standards of modern industrial journalism.

For this expansion, there is a strong foundation. For thirteen years AVIATION has assiduously striven to serve the members of the aeronautic industry, not only with authoritative articles, complete news and constructive ideas, but through assistance outside of its publishing activities. To do so the publisher and the members of the staff have often had to set aside personal or individual desires for the good of the whole. As a result the magazine has always possessed a tone and quality which could not have been obtained in any other way.

During the four years which followed the World War, when more than a few aeronautic organizations passed out of existence, AVIATION carried on with its work in spite of almost insurmountable difficulties. At that time it was realized that the military and technical phases of flying which had been the chief interest of the paper up to then, should be expanded to embrace

the increasing importance of commercial aviation. And as a consequence the editorial policy of AVIATION was altered to comply with the new needs and demands.

Since that time the world has witnessed a phenomenal growth of an industry that not long before was but a myth in the minds of many. In line with this progress, AVIATION grew and prospered. The fact that during the past year its staff has been doubled bears witness to this growth. Incidentally five members of this editorial staff are pilots and a sixth is now taking instruction.

This success has been founded on the high principle of unselfish service to the reader and to the industry. And it is but a further expression of this ideal that the paper has now become a McGraw-Hill publication.

The McGraw-Hill Publishing Co. is well known throughout the entire world of business, as publishers of twenty-five engineering, industrial and business magazines. It, too, has won the respect, admiration and friendship of the industries which it serves, and will contribute to the aviation industry a wealth of experience and knowledge from other fields, that are becoming more and more closely allied with aeronautics. In addition the new alliance will bring about a much desired stimulation in the aeronautic publishing field.

Of course, it is not without a certain regret that the publisher of AVIATION has come to recognize the many advantages of a merger with this larger organization. The decision was influenced by our responsibility to the present and future growth of aeronautics. It means that AVIATION will be able to serve the aeronautic industry more completely than ever before.

The old publisher of AVIATION can not take this next step in AVIATION'S progress without expressing his sense of personal obligation to his friends in the industry for the hearty cooperation which has made a happy experience of what otherwise would have been a difficult task.

Why McGraw-Hill Desires to Serve the Aviation Industry

IN MAKING this announcement that AVIATION has joined the McGraw-Hill group of industrial, engineering, trade and business publications, I wish to express our gratification that we are entering this field with a paper that is not only the pioneer but the recognized authority on aeronautics. Our interest in the aviation industry is natural. For it has been our aim to develop a group of publications rendering an intimate service at the very heart of American industrial and business life. And air transportation is fast becoming of vital importance to both industry and business.

Several of our papers have long been closely concerned with various aspects of the progress of aviation. *American Merchant and Factory* and *Industrial Management* have been encouraging high efficiency in manufacturing production. *Engineering News-Record* has given much attention to the civil engineering problems of air ports, runways and streets. *Electrician World* has discussed the lighting of airways and air ports, and also signal systems. *Chemical Metallurgical Engineering* has contributed to the solving of many problems of weight, corrosion and wing surfaces. *Bus Transportation* and *Electric Railway Journal* have been recording the developing of this new agency of commercial transportation. *The Magazine of Business* recently conducted a year's practical experiment in "Flying for Business," operating its own plane. This broad interest therefore, has a very logical expression in our decision to actively serve the aviation industry itself.

In their entirety, McGraw-Hill publications



James H. McGraw
Chairman of the Board
McGraw-Hill Publishing Company

now cover the five major branches of engineering—civil, electrical, mechanical, mining and chemical—and the industries allied with them. They embrace also two divisions of the field of transportation, the electrical and radio trades, the food and textile industries. In addition they serve the interests of production, management and service-to-production in all manufacturing industries; and finally, the broad field of commerce, business and finance.

Aviation is now becoming a vital tool of modern business, and a new basic industry is in process of development. McGraw-Hill desires to contribute to the progress of aviation a publishing service that will provide every facility of modern industrial journalism to aid in the solution of its inherent problems.

We assume the publishing direction of AVIATION with the conviction that the resources of the McGraw-Hill organization will bring new strength to this paper and practical benefits to the industry beyond the reach of a single publication. We enter this field only because it is clear that there is an opportunity to render a service that will advance the art of flying and its economic development. We are glad to welcome into our organization a group of men of the type responsible for the splendid record and fine prestige that AVIATION now enjoys.

James H. McGraw

Activities of the Aero Chamber of Commerce

By JAMES P. WINES

SINCE its formation and incorporation as a non-profit organization under the laws of the State of New York in 1919, the Aerautical Chamber of Commerce of America, Inc., as it is formally known, has been fostering the advancement of commercial aviation through efforts exerted by the board of governors and a number of committees and committees within the industry itself.

Much of the work in the first years of its existence was rather indefinite in character, for tangible results from promotional work are often hard to see. Nevertheless, the value of the work was recognized clearly. As a result, the Chamber, as a trade organization representing the combined interests in the aerautical industry, has increased its influence and influence has reflected the development of the industry in its growth.

Like all other aeronautical organizations, the Chamber of Commerce has made tremendous strides in the last year, and particularly in the last few months. This growth is the result, of course, of the development of the industry. It is also the result of the institution of an annual program for expansion, which was adopted at the annual meeting of the organization, held July 24, 1938, when changes in the by-laws were effected for the purpose.

Up until that time, the Chamber was a highly centralized body. Its members, whether they were manufacturers of commercial aircraft or of accessories, were grouped together. There was no attempt made to segregate them into different divisions, and there could be no attempt made, because there was no necessity for the purpose. The method of organization had served quite well during the first few years, but with the growth of the industry it became truly inadequate.

The program for expansion called for the decentralization of the Chamber and an organization both geographically and temporally, an increase in the number of governors, the division of regional vice-presidents to head each of the geographical divisions, the appointment of a large number of standing committees, and an enlargement of the staff at the New York headquarters. In addition, the various types of membership were revised.

While the program has not yet been carried out in its entirety, much has been accomplished since the plan was put into effect. The provisions for taking in almost everyone interested in aeronautics, in one way or another,

and the formation of sections for the various branches of the industry, as well as the establishment of geographical divisions, have had an extremely beneficial effect. Through this system, the governmental interests have been facilitated, and the Chamber has been able to render a greater service to its members. The administrative activities, however, can be easily, which would not have been possible under the older and more clumsy organization.

Under the new system, there are three classification classifications. These are "organization," "associations," and "manufacturing." Associate memberships are for clubs, societies and associations interested in aeronautics, and in this category fall encapsulates, chapters, and sections, boards of trade and trade associations, advertising committees or sections. The continuing members are individuals, who are interested in commercial aviation as a business, while the organization memberships are granted firms having an interest in aeronautic enterprises. The organization memberships are further subdivided into three classifications.

Organization members in class "A" are aircraft and engine manufacturers, air transport operators, affiliated transport operators, such as railroad and steamship lines utilizing aircraft, financial institutions specializing in aeronautics, insurance companies and classifiers of aeronautical parts, and the producers of aviation tools and lubricants. Class "B" includes the manufacturers of aircraft and engines, whose products are still in experimental stage; accessory manufacturers, aircraft and airway designers, builders, managers and operators; publishers of papers and magazines dealing with aeronautics; engineers, manufacturers, research organizations, and operators of equipment and devices for advertising in connection with aviation, and aeronautical engineers. In class "C" are jobbers and dealers in aeronautic supplies and accessories; flying service operators; aviation schools; air traffic agencies, shipyards, furriers and others supplying specialized services, and the manufacturers and distributors of specialized aviation products.

At the helm of the Chamber is a board of 21 governors, elected annually. Nineteen members of the board are selected by the organization members. Of this number, 10 are of class "A," and are chosen by that group, eight are

class "B" members and are elected by that group, while class "C" selects but one of its own members to a governor. The associate and standing committees, under the chairmanship of each of these, are like associate committees occurring during the year may be filled by a majority vote of the governors at any meeting.

The president, vice-president and the general manager of the Chamber, all of whom must be members of the board of governors, are elected by the board at its annual meeting, when a secretary and a treasurer are also selected. The by-laws also provide that an associate general manager, an associate treasurer and an associate treasurer, may be appointed by the board, and, if elected, that an honorary chairman of the board, who is an ex-governor, may be elected.

Under the board of governors is an executive committee. The president and general manager, by virtue of their offices, automatically become members of this committee. To complete the unit, which is perhaps the most powerful in the entire organization, the board of governors elects three members. The executive committee is charged with the responsibility of carrying out policy and operations, which it approves but this body itself makes recommendations and acts in an advisory capacity. It has no actual authority. The executive committee in reality is in absolute control, as may be seen from the by-laws. That portion of them, dealing with the function and authority of the committee, is as follows:

The south central division was the first to be organized. This division was organized at a meeting held April 26, 1938, when 16 aeronautical interests responded to the regional vice-president's call. Recognition of the north central division led to the formation of a divisional membership committee with the result that there are now 30 Chamber members in that section of the country. This is an increase of 150 per cent, although the division has not been formally organized and probably will not be joined before the later part of March. Plans are underway also for the formation of the southern and the northwestern divisions in the near future. Only six divisions are contemplated by the board of governors at the time the divisional plan was initiated, but at the request of the aeronautical interests in the southeast, a seventh district, the southeastern division with headquarters in Miami, was established by the board at its last meeting.

Aside from the regional divisions, the Chamber of Commerce is now separated into 15 topical sections. Each section is composed of the members engaged in the same



E. B. Rentschler, head of Pratt & Whitney Aircraft Co. and president of the Aero Chamber of Commerce.



Left to right: Orson A. Shinnecott, treasurer; E. S. Bradley, vice-president and general manager; and Luther K. Bell, secretary of the Aerautical Chamber of Commerce, Inc.



Left to right: Orson A. Shinnecott, treasurer; E. S. Bradley, vice-president and general manager; and Luther K. Bell, secretary of the Aerautical Chamber of Commerce, Inc.

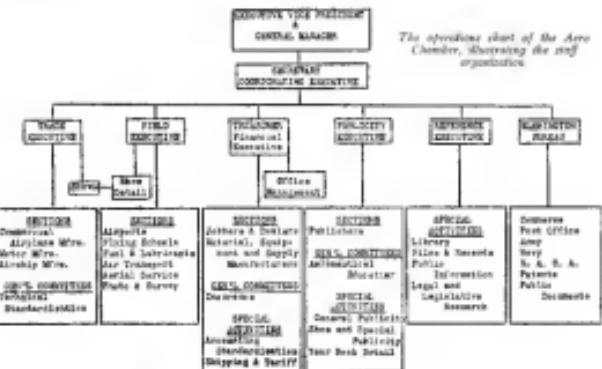
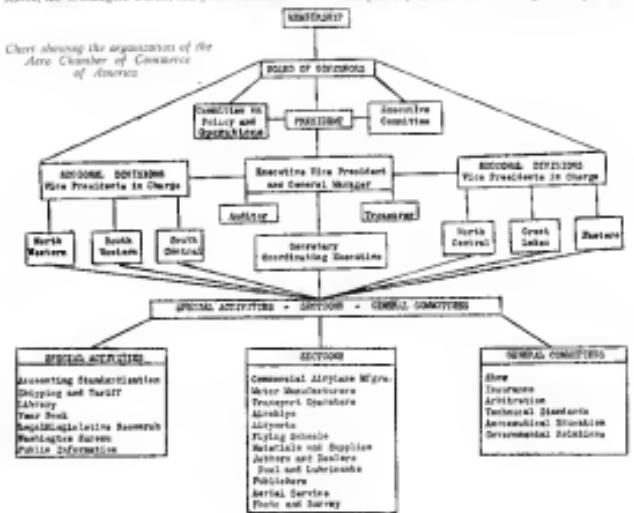
plane of commercial aviation, and, of course, each is represented particularly in its own branch of the industry. Only seven of the groups are operating actively thus far. These are the commercial airplane manufacturers' association, which became active in August, 1928; the regional manufacturers' group, flying at August, the airports and the terminal airports' association, which became active in October, 1928; the air mail operators' association, the Interstate Air Mailers' association, the transport operators' group, which came into being during the meeting under conference in Washington, and the airmail division, organized while the Interstate Civil Aeronautics Conference was in progress. The scope devoted to material, equipment and supplies, which will include the manufacturers of aeronautical equipment and supplies, publishers, aeronautical service, and the airmail division.

We deal with the ever increasing number of problems at the industry, the program for expansion called for the establishment of a number of new steering committees. The show committee and the aeronautical education committee have been in existence for some time, and to these were added committees on insurance, arbitration, technical standards and government relations. The members of these new committees have not yet been appointed, but it is anticipated they will be named shortly. In addition to these new committees, the number of special committees of the Chamber was greatly increased. These new include accounting, standardization, shaping and tariff, the library, the year book, legal and public relations, the Whidbey Harbor and public information.

For the members of the Chamber, themselves, to have developed the business of the organization and the increased number of members in their ranks would have created a tremendous source of labor. With this in view, the board of governors authorized the vice-president and general manager to establish an executive staff, consisting of a co-chairman executive and six assistant executives, each of whom would be assigned specific claims, and at the responsibility of the work might be definitely divided. In accordance with the plan, the secretary became the co-chairman executive and under him were established the offices of male claims, field executive, financial executive, who is the treasurer, publicity director, foreign office executive, and the director of the Washington office.

The trade executive deals with the aircraft shows of the Chamber, the commercial airplane manufacturers, the engine manufacturers and the aircraft maintenance section in the legal organization, and also handles the work of the general executive on technical standards, aircraft registration, aircraft charts, aircraft accidents, a case of the work of the aeronautic flying school, fuel distribution, air transport, aerial surveys, and photography and survey services. The management of the actions of the Chamber comes under the jurisdiction of the executive, who deals also with the pilot and dealers' section, the material equipment and supply manufacturers, the general management on insurance, and the application of increasing standards and shipping and tariff.

Chart showing the organization of the
Auto Chamber of Commerce
of America



*The operations chart of the Aero
Chamber, illustrating the staff
organization*

...the general committee on aeronautical education, and three special committees. These are given publicity, and special publicity and the year book detail the work. The executive has charge of the library, the files, records, public information, and legal and legislative work. Commerce, the Post Office, the Army and Navy, the National Advisory Committee for Aeronautics and public documents are listed as being the agencies of the Washington Bureau head.

Perhaps the greatest amount of work has been accomplished by the commercial airplane manufacturers' societies in the institution of the new schools of thought. It operates as a special committee, one being now established at each of the 120 universities of the country, to which he leads or sends some of the best young engineers. There are now 44 airplane manufacturers in the Chamber, and of these are active in the educational work. The interests which they are displaying, is shown by the fact the group has held four national conferences since its last organization as a section. Two of these were to

standardized agreement for the use of the codes and airplane purchases are also being developed. The manufacturers also are now co-operating with the national associations of finance companies in an effort to develop a system of leasing aircraft, which will aid in the development of airplane sales on a long basis. It is expected that the finance houses subject to the present rules on the ground will be able to use these plans to meet the requirements of the aircraft buyers. Another of the outstanding accomplishments is the formation of a standardized plan for the performance of commercial planes. This plan, which has been in use for more than a year, was evolved by an

couse serious losses among branches of the industry. Technical coordination also is a problem with which the airplane manufacturers have been coping. Including the separation of production, the division of design and engineering, as well as the form of construction, a committee has been appointed to act as a liaison group between the section and the Society of Automotive Engineers.

Emphasis in the purchase of materials and supplies usually has been a subject one which the group has divided. In this connection, the manufacturers arranged a meeting of their purchasing agents as a means of comparing the costings of aircraft and for the purpose of establishing permanent standards for the procurement of the various parts. This meeting was held at Wichita in January. The staff of the Chamber, acting in the movement, is now compiling a directory of the various sources of supply for use of the purchasing agents.

The tremendous increase in the number of operators sent out principally by share in other lines of business has presented a problem entry into the transportation field led the manufacturers to pass a resolution directing the section of the Chamber to take the necessary steps of releasing the burden clause upon the individual members. As a result, the Chamber executives are attempting to keep statistics regarding all the divisions of the industry.

In addition to the definite accomplishment of the continental airplane manufacturers' section since its formal organization, the group has formed a number of special committees, which it is believed will be completed shortly. One of these is the committee of aircraft and aircraft tariff. Again, the staff of the Chamber, is arranging to make an analysis of the subject, which it is hoped will bring about greater economies. Committees are being arranged with experts, railroad and freight officials as far as the subjects of packing, shipping and crating and rates.

A survey of the accounting methods used by the plane manufacturers is also being made in an effort to formulate a standard system which can be adopted by the industry's manufacturers. Later it is believed, similar systems will be arranged for airplane distributors and dealers. The Treasury Department of the Federal government has been interested in this, since it will mean a simplification of its work in collecting tax returns. Another special activity, for which the manufacturers are responsible, is the plan for the organization of a legal and legis-

lative department to be instituted by the Chamber as a part from itself at first.

The air transport operators' section, is spite of its recent organization, is becoming of distinct importance in the Chamber. In fact, the Chamber is planning to open an office in Chicago in the near future of the section, which now has 16 members, including the operators of the major trunk lines of the country. Traffic, rates, utilization of service and the radio question are a few of the problems with which the operators have been working.

The main problem is probably of the greatest importance and is that of the need for a more definite and effective solution following the formation of the section at the Washington conference of the airline operators, the representatives of the Federal Radio Commission, the Department of Commerce and the War and Navy Departments. This resulted in a definite agreement of cooperation on radio communication by the trunk lines of the country, the selection of specifications for the purchase of communications equipment, and the recommendation to the Federal Radio Commission for the selection of certain bands for the use of the lines.

The engine manufacturers' group, which now has 12 members, lost in time in beginning to function as a section of the Chamber. At the inauguration meeting in Chicago, the engine builders appointed a subcommittee to survey the present situation as a means of co-operating with the engine makers. At the same time, it decided to enter negotiations with the department of Commerce for a classification of aircraft engines and the required type certificates. It is understood that the manufacturers feel the present system is too slow and holds up production for too long a period. They are endeavoring to make arrangements so that the Department of Commerce staff can be conducted at their own plants under the supervision of Department of Commerce men.

The fuel and lubricants section, soon to be formed, has taken a decided stand against the furnishing of free gasoline to aircraft operators, and has recommended that the breaking airports, supply for the purpose of obtaining publicity. The practice has reached a point, it is said, where it is of considerable expense to the oil companies, and the members of the Chamber group are attempting to eliminate it. The section has also requested that the gasoline manufacturers furnish data concerning any problems they are encountering with fuels and lubricating oils, so



Left to right: Claude V. Crosson, vice-president of the south central division; Frank H. Russell, head of the aircraft engine manufacturers; and P. G. Johnson, vice-president in charge of the northwestern division.

that it may co-operate in an effort to solve those problems. A sub-committee on aircraft fuels has been formed and is in close touch with the Society of Automotive Engineers, the Aeroplane Society for Testing Materials and the department of the federal government.

The shipboard section of the Chamber has only three members, but it may be remembered that the same is involved in the business of this branch of the industry are tremendous. The shipboard group has appointed a committee to advise the Chamber as to conduct in quarters concerning the operation and manufacture of lighter-than-air ships.

Membership in the shipboard section is now limited to aircraft manufacturers, although the group hopes to co-operate closely with the associations including the airport engineers and the manufacturers of airport equipment. The chief work of the airport engineers as far as has been the case of improvements in the standards of service and airport equipment. It is expected, that as a result, a standardization of rates and services will be obtained and that a uniform traffic standard will be formulated. A committee of the section also is working with the National Board of Fire Underwriters in the preparation of a ruggedized code for the reduction of fire hazards at airports.

The flying school section of the Chamber, like the airplane manufacturers' group, was formerly a committee. The principal work of this section since its organization has been the issuance of a code of regulations for accrediting flying schools. These requirements have been incorporated by the Aeroplane Board, Department of Commerce, and the section is now working in conjunction with the governmental body toward the establishment of an A. B. C. rating system for all schools that apply for recognition. It is believed that the adoption of such a system generally will eliminate any schools of questionable standing and will further strengthen the others. In its work, the flying school group has enlisted the aid of the Better Business Bureau throughout the country in the prevention of misrepresentation in advertising.

As a result of the increased work, which has been thrust on the staff of the Chamber by the program for expansion, it has been found necessary to expand the office forces besides adding to the number of executives. The volume of work accomplished in the last year and the changes that have been made are cited in the annual report for 1938, which has just been made public.

Since the new organization was effected, the Chamber has formed a very definite policy to regard as overall share. In plan to hold one national show each year, of which the International Aeroplane Exposition in Chicago was the first. For the purpose of handling the finances, the Aeroplane Exposition Corp. was organized by the members. The Chamber, of course, is a non-profit organization under the laws of incorporation. However, the money obtained by the exposition rents back for the use of the industry generally.

Before the organization, which is now in reality a staged by the industry through its own organization, the Chamber will sponsor two other types of exposition, although the membership has gone to great expense of definitely opposing aeronautics shown arranged by professional promoters. These two types are known as class "B," as regional shows in which the Chamber will participate in the management and will receive a portion of the profits; and class "C" shows, which are purely local exhibitions and are operated by the chamber. The first of these is a non-profit organization having as a means of promotion local aircraft sales. The Chamber's national exposition is the only one given as "A," rating as far.

In line with the policy adopted by the Chamber, the show committee has arranged two class "B" and two class "C" shows this year. The class "B" expositions are the Detroit show, which will be held in April, and a Kansas City show, which will be held in October.

The Buffalo show, which will be held in March, and an exhibition in Wichita, which will be held some time during the summer are the two that have been arranged.

As a result of the increased number of activities and its diversification, the Chamber now has a much wider appeal than heretofore. This is shown clearly in the tremendous increase in membership during 1938. A year ago the membership totalled only 264. It has now reached 1,200. The organization members are distributed among 35 class "A," 10 class "B" and 10 class "C" shows with 26 at this time last year; and there are 146 members in class "B," an increase with 79 a year ago. The class "C" organizations members and the associate and affiliate members have also jumped in number from 132 to 261. With the increased funds available, a method of organization that will permit infinite expansion and the constantly growing number of members, the Aeroplane Chapter of Commerce should assume an ever increasing position of importance in the industry.



Left to right: J. Dea Alexander, head of the airplane manufacturers' section; Harold E. Pizzano, vice-president in charge of the eastern division; and Cal Paul Henderson, Great Lakes regional vice-president.

The Todd Monoplane

Light Externally Braced Monoplane Specially Designed for Use as An Express Carrier in High Altitude Operation

By H. A. LINDBERGH

A MONOPLANE for use in high altitudes, although it is, of course, to be used elsewhere with a great deal of success, has been designed and built by E. B. Todd of Douglas, Wyo. The first model was produced with an OX-5 engine, but the majority of these power plants made it necessary to provide a detachable engine mount integral with the fuselage so any of the various models in present use up to and including about a 100 hp. engine can be installed as desired to meet the requirements for which the particular plane is intended.

The Todd monoplane has been designed to be used as a light express carrier, but can be easily adapted to regular transportation and passenger carrying by removing the removable front unit or the baggage compartment. There are many parts of the country where greater wing surfaces are advantageous because of the high altitudes, so this plane was primarily designed for such regions that necessitate long runs for take-offs and fast landings when the customary short wing planes are used.

The wing, which has a maximum span of 30 feet, 10 inches, is 15 ft. long each and a 10 ft. center section contains two gasoline tanks and 20 gal. capacity auxiliary tanks. Round "T" section spars with spruce ribs are used in the construction of the wing. A Clark Y curve, which is covered with fabric, is used in the engine mount, which is of welded steel tubing, such as is used in the construction of the wing. A mid-view of the OX-5 power unit. Todd parent monoplane

the fuselage by struts of streamlined tubing placed at such an angle that good visibility is possible for the pilot. The outer part of the struts is attached to the fuselage by large rigid fittings and are supported by left struts that are attached to the lower corners on each side of the fuselage. The left struts are of Clark Y section to a point midway from their lower tips. The upper halves being split into two streamlined struts that are connected with flexible fittings to the upper panels. At the point where the left struts on each side of the fuselage, branch out into two streamlined units they are 18 in. in width, with the width of the struts of the struts on the under side of the wing being 6 ft.

In order to decrease the vibration of the left struts as well as to increase the structural strength of the plane, two streamlined fairings connect the wing and the main struts on either side of the fuselage. The fairings are controlled by bell cranks with the wires running through the front left seats to the fuselage, where connection is then made with the stick. The fairings extend in 7 ft. from the outer tip of the wing on each side and are 24 in. in width, of ample size to easily control the plane in flight.

The fuselage, of welded steel tubing, such as is used in the engine mount, is well streamlined and the front unit is referred to the point where the parasite resistance is mini-



Front quarter view of the Todd monoplane, which has been designed as a light express carrier for high altitude work.

mum and yet the desired space is available in the front compartment as well as in the pilot's cockpit. Fabric is used in the covering of the fuselage up to the nose section, which is covered with aluminum, the cylinder heads and the radiator arms being exposed so as to make those parts readily accessible as well as aid in the cooling of the engine. A Warner type strut is used in the construction of the fuselage in the station containing pilot's seat and from there forward the Pratt type is used. A door on each side of the fuselage provides ready access to the engine and the fuel tanks. The U. S. G. Aerovane Cor. radiator is mounted on the mid. of the lower long strut tubes, which extend forward from the engine supports thus preventing it from obstructing the pilot's vision as it is when the radiator is placed somewhere between the upper wing and the top of the fuselage.

The empennage is built up of welded steel tubing enclosed with fabric, the horizontal stabilizer being manufactured from the same material as the fuselage. The plane is on a ground. Sheet streamlined wire for landing gear from the upper and lower surfaces of the stabilizer to the fix and the lower part of the fuselage respectively. The canary stick and pilot control is used. The tail skid is built up of small spring leaves fastened to the past, with shock cords being used to lower the struts on the plane when landing.

The pilot's cockpit is equipped with the instruments required for the use of the OX-5 and the Cessna regulator. Both of the two tanks feed through a single gasoline valve which is in full view of the pilot. The gas gauges, which are located on the under side of the gas tanks, are also visible from the rear cockpit. If the plane is to be used for student instruction, then the dual controls can be easily installed in the plane.

The landing gear, although the original plane was not so equipped, will be of the split type so much as is use of the present time as the majority of the planes. Streamlined landing gear is used in the construction of the undercarriage with 26 in. x 4 in. wheels, having a 5 ft. tread. As it is

stationary on most of the lighter type planes, a shock cord arrangement helps to relieve the strain on the plane when landing.

The Todd Monoplane was test flown at the high altitudes of 10,000 and will undoubtedly be continued to be produced at Douglas, takes some offers for a change of site now under consideration should prove more advantageous. However, the plane will be built in high altitude regions as it is desired to test the monoplane under conditions equal to, if not greater in severity to that which it would be used in actual service by the government.

The following general characteristics and performance figures were submitted by the manufacturer:

Wing span	40 ft.
Cross section	10 ft.
Outer panels	15 ft.
Chord	5 ft.
Leading edge, including fairings	200 in.
Root of ailerons	14 in. x 7 in.
Length overall	22 ft. 4 in.
Height overall	2 ft. 5 in.
Height, fully loaded	1,500 lb.
Weight empty	3,270 lb.
Per load	200 lb.
Wing loading, full load	24.5 lb. per sq. ft.
Power loading, full load (O-X-5)	16.25 lb. per cu. in.
Rate of climb	Clark Y
Angle of ascension	35 deg.
Dihedral angle	3 deg.
Gust factor	40 per cent
Wheel tread	5 ft.
Performance	
Maximum speed	120 mph
Cruising speed	110 mph
Landing speed (4,000 ft. alt.)	55 mph
Service ceiling	12,000 ft.
Absolute ceiling	14,000 ft.
Rise for take-off	250 ft.

Watercooled Aircraft Engines

By JAMES M. SHREMMER
Assistant Commander, U. S. N.

American engineering opinion as well as popular opinion is overwhelmingly in favor of aircraft engines at the present time. This is natural, since all of the recent long-distance flights made by American aviators have been achieved with watercooled power plants.

Comparing watercooled engines with air-cooled engines, we find that the former are more reliable. These are due to an overall cooling system which in a conventional engine requires an addition of about 600 lb per cu in the airplane powerplant weight, and second, reduction in ruggedness and its weight due to the addition of a cooling system requiring piping, expansion tank and radiator. This second handicap is due to the disadvantage of the watercooled powerplant (as a whole) in regards durability, ease and cost of maintenance, and initial cost.

In view of these factors, there is still a place in the pattern for the air-cooled engine. This is evidenced by several remarkable flights of the past year and a half. Some of the most important of these are: (a) The Schneider Cup Race of 1937. (b) The world circling flights of Coates and Lebré. (c) The famous and distance records of Del Prey and Ferraria in the Savoia-Marchetti S-64, powered with a Fiat



Each of the above flights, *Gloster Gladiator IV*, was a different part of the series of Schneider Trophy contests. A description of the first contest follows: *Interior of engine in order*

(a). The British entries for the Schneider Cup Race at Verville in 1937 included three types of engines: geared and direct-drive watercooled Napier "Lion," and an air-cooled Bristol "Mystery" engine. All of these engines developed about the same horsepower but the powerplant weight of the Short "Crusader" plane in which the "Mystery" engine was installed was several hundred pounds less than that of the watercooled motors. This great saving in weight was due to the use of fewer parts, and of generally lighter materials throughout. Despite the weight handicap, the watercooled motors were 60% faster as base than the aircooled motor.

The reason for this is quite obvious. The watercooled engines were completely enclosed, and their wing radiators followed the contour of the wing surface exactly. The drag of the airplane with radiator and engine installed was little greater than would have been the drag of the airplane without powerplant and with the engine out.

The enclosed engine, on the other hand, required no radiator, but could not be completely enclosed with cooling due to the necessity for exhaust and exit of the cooling air.

(b). The world-circling flights of Coates and Lebré demonstrated the dependability of an efficient watercooled powerplant in extremes of weather. The Bruguet airplane used on these flights was powered with a 600 hp Hispano-Suiza watercooled engine. The engine was completely enclosed, the engine tail end and its engine nacelle mounted above the trailing edge of the wing. The engine was a 12 cylinder watercooled Pratt driving a propeller propeller.

The use of a watercooled engine in this plane had the advantages previously set forth in discussing the Schneider Cup motors and the Bruguet of Coates and Lebré. In addition the powerplant installation on this Savoia-Marchetti was used in which the single direct-drive watercooled engine would have been driving under the rear wing in the same condition. When driving a tractor propeller, the unequal airfoil section creates a blod of cooling air of sufficient velocity, no matter what the speed of the airplane. With a pusher propeller installation as in the S-64, the velocity of the cooling air is much more dependent on the speed of driving of the airplane. Hence an aircooled engine driving a pusher propeller is liable to overheat under certain conditions of operation. This is a particular source of trouble.

The use of a watercooled engine in this airplane, however, is due to the conclusion that use of the most efficient is a monoplane wing with the propeller located above and slightly behind the trailing edge of the wing. This combination was used on the S-64, and may be employed with increasing frequency in the future.

One other aircraft powerplant installation in which the underwing radiator was remarkable. The smoothness of the 12 cylinder engine insured a minimum of vibration, the minimum radiance insured the maximum of optimum engine operating temperatures under all conditions, and the low temperature of the air with cooling eliminated the possibility of ignition trouble due to sun or damping. As in the British Schneider Cup winner, the cooling was basically fanned around the engine, giving a minimum fairing drag and excellent forward visibility for the pilot.

(c).

Savoia-Marchetti S-64

powered with a 12 cylinder Pratt engine and from non-stop from Italy to Brazil by Del Prey and Ferraria. Below: The Hispano-Suiza S-6 with which Flight Lieut. S. N. Webster was the 1937 Schneider Trophy Contest.

The watercooled engine in question is the one in which the engine is totally enclosed in the aircraft structure. This condition is found in the two new rigid seaplanes recently contracted for by the Navy, where the engines will be located inside the hulls and the propellers will be supported on outriggers and will be driven through gear shafts. The same condition arises in designs of large flying boats, where the powerplants are to be located inside of the hull. In this case, it might be possible to use enclosed engines by providing a tunnel for cooling air, but only at a considerable sacrifice of aerodynamic efficiency.

A recapitulation of the relative advantages of the two types of engines leads to the following conclusion:

(a) That the aircooled engine powerplant is generally superior in regards weight per horsepower, dependability, durability, ease and ease of maintenance.

(b) That the aircooled engine powerplant is more economical in regards fuel economy.

(c) That the watercooled engine powerplant is potentially superior in regards efficiency per horsepower.

(d) That there are special cases calling for powerplant installations in which an aircooled engine should not be used.



The "Flying Dutchman"

*Single-Place, Low Wing Monoplane Powered With 40 H.p. SR-3 Engine
Now Being Produced by Sashly Aircraft Corp.*

To meet the demand for a light, economical plane to be used by students in acquiring the experience necessary to obtain a license, and the further demand for a sport plane within the purchase range of the average citizen, the Sashly Aircraft Corp., which has designed the "Flying Dutchman," monoplane, has started a production schedule of four planes a week, and this is soon to be increased. The plane has a high lift wing and is powered with the three-cylinder Sashly "Sky Racer" engine, which develops 40 h.p. at 3800 r.p.m.

The "Flying Dutchman" is a low-wing, open cockpit type, seating one person. With the 58.3 engine, the plane has a high speed of 80 mph and a cruising speed of 70 mph. It lands at 25 mph and the landing run is less than 100 ft. The take-off run is approximately 300 ft. The service ceiling is 12,000 ft. and the rate of climb 200 ft. per min. At cruising speed the plane will fly three hours.

The plane has a welded steel fuselage and wood and wire wing structure, in which, however, the compression members are welded steel wire Warren trusses. The spars are of the box type, with spruce capriets and mahogany pinned webs. The capriets are tapered and are spaced at 18 in. apart on spreader-bands. The webs are all twenty-four in. long and are pinned at the center and at an angle of 90 degrees to the webs in the other. The wing is a two-cellular, a type of construction made possible by the truss wing section employed.

Fittings are attached directly over the spars-in-bands, which leaves a solid framing for absorption of strains. They are all cut from cold-rolled half hard steel plate and are "wrap fittings" that is, they extend completely around the spar. Each fitting is held in place by a group of chrome-nickle steel bolts extending entirely through the spar.

The former ribs are of spruce, built up in the form

of Warren trusses and with each sparion gartered with plywood. The trussing is unusually close. Although it weighs but two ounces, the rib will support 380 lbs. The ribs are spaced 10½ in. apart throughout the span. Compression members are riveted to the webs. The drag-linking is suspended from ribs and is preference to steel cables or wires because these will not break at do-it-yourself types of bracing with which amateurs must be used. Square section rods are used because any twist that might develop in adjusting the bracing is easily seen and can be corrected before the wing leaves the factory. The tie-rods are installed against vibration

Excessive Design for Flying the Plane

The wing tips are rounded welded steel tube framing the framework which is common to the "Flying Dutchman." The shape is such as to provide the wing with an effective airfoil which gives a high degree of lateral stability in flight. The steel construction prevents damage should the wing come in contact with a larger obstruction or another plane. As the wrap-type structure is welded in a zig-zag, each wrap-up is of exactly the same size and can be kept in the precise design chosen.

The ailerons have welded steel tube structures and are hinged to the main fuselage with brackets which are secured on the rear spar. The hinge brackets are very light, but will support more than five times the maximum possible load on the ailerons.

The attachment of fuselage to wing is also very strong. This linkage is effected by means of fittings which completely encircle the wing-spar and the factor of safety of the coupling is in excess of 13. The fuselage is built of a structure of welded steel tubing, the form being a Warren truss. There are no welded joints in tension, all being in compression or in shear. Cold carbon steel is used because of its adaptation to welding and the fact

A side view of the Sashly low-wing monoplane, the "Flying Dutchman."



AVIATION

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that it is less susceptible to deterioration and fatigue than some after six months of use. But this part is used on the fuselage structure.

The engine mount is welded from sheet tubing and embossed steel plate. It is strong light and framed against distortion under tension. The attachment to the

plane is assure durability and proper symmetry. Aileron and elevator are actuated by steel cables connected to the conventional metal control stick. The aileron cables, however, run diagonally so as to be in a better position to control the roll of the plane. A pair of rods of steel tubing actuate the ailerons. Rudder control is through cables attached to aluminum tubes cast plastic. The control horns are all of stream line tubing.

Controls are extremely easy of operation, a point which was emphasized in constructing the plane because of its application to the needs of flying clubs, inclosed-pilot and sport fliers. Frequent and thorough inspection is one of the requirements of safety in airplane operation and the "Flying Dutchman" every part of which has been designed to make this work easy. Only one small power car is used on each end of the wing, and is designed to permit complete suspension of the aileron controls while by opening one end, all other controls are made visible throughout their length.

All cowling is of sheet aluminum. The engine cowling is so arranged that it can be dropped readily for inspection or adjustment of the carburetor and replaced within a few minutes. This cowling is held in place by positive action snap clamps which cannot become loosened.

The fabric employed in the plane is the grade specified by the government for military aircraft and is cut to shape and sewed before being placed on the plane. It is anodized



A front-quarter view of the "Flying Dutchman," manufactured by the Sashly Aircraft Corp.

resilience in four machined holes in double shear. This attachment is simple and inexpensive, yet sturdy and permits the engine to be dismounted or replaced with ease.

Landing gear is of the split-type type, permitting the shock-absorbing strut to be set up in any position of the lower gear. The gear is of chrome-nickle steel and rating light but very strong. The shocks of landing and taxiing are taken by rubber rings, which permit an equal tension to be maintained on both sides, which is difficult if not impossible when cast iron is used. The wheels, 28 by 3 in. in size, are manufactured especially for this plane. Their spoke area is covered with fabric, dipped and painted to match the rest of the plane. The tailfin is a leaf spring, lined with a sand shell, a type chosen to be simple and resistant to wear.

Exceptionally Clean Design

The whole plane has very clean lines. Two anodized lead shapes are rounded forward and aft of the cockpit, to deflect the air currents around the pilot's head. The after one is padded as a headrest and inside both are trussed arched at usual tilting, welded firmly into the main fuselage members. These will take up shock and protect the pilot from injury in event of the plane's nose-over. However, owing to the low-wing construction and good balance, it is almost impossible to cause the plane to nose over.

The cockpit is padded all around and is lined inside with weatherproof upholstery fabric. There is a small speed compensation behind it. The pilot's seat is a contoured chair, very comfortable and mounted at an angle with the cockpit floor. The windshield is heavy transparent celluloid.

The control stick has a cellular grip and the throttle has a leathered handle, very comfortable and easy to grip. The stick is set in the cockpit floor, as are rudder or brakes or cockpit. The instruments are those designated by the Department of Commerce and the accessories include a fire extinguisher and first aid kit.

The firewall separating engine and cockpit is of metal and all piping and controls passing through it are protected to insure a tight joint. The gasoline tank is a stress plate container, supported in padded steel mountings in the upper part of the fuselage. Its capacity is 10 gallons and it is also a trim tank. The engine is mounted in front of the fire wall, connecting to the oil pressure. All results are of the flexible loose type which reduces the risk of breakage from vibration to a minimum.

Like the ailerons, rudder, elevator and fairing of welded steel tubing covered with fabric. They are welded in



D. E. Sashly, president of Sashly Aircraft Corp., standing beside one of the monoplanes manufactured by his company.

by lead stitching so tape wrapped on the longitudinal and transverse. The completed plane is given five coats of high grade aircraft finish, hand dressed with paint and varnishes.

Specifications and performance of the plane follow:

Span	30 ft.	26 ft.
Chord	4 ft. 8 in.	
Length	16 ft.	
Height	6 ft.	
Weight, empty including interior	108 sq. ft.	
Airframe area	14 sq. ft.	
Radius and fuel area	100 ft.	108 ft.
Engine and stabilizer area	30 sq. ft.	
Exterior and stabilizer area	30 sq. ft.	30 sq. ft.
Wing curve	Germanes	287
Wing loading	1.73 lb. per sq. ft.	1.73 lb. per sq. ft.
Power loading	1.94 lb. per h.p.	1.94 lb. per h.p.
Aspect ratio	6.3	6.3
Wing camber	1.50 in. for the cambered area	540 lbs.
Disposable load		215 lbs.
Total weight		755 lbs.
High speed		75 m.p.h.
Cruising speed		20 m.p.h.
Landing speed		25 m.p.h.
Rate of climb, sea level		500 ft. per min.
Service ceiling		12,000 ft.
Take-off distance		75 ft.
Fuel consumption		3½ gal. per hr.

Packard to Begin Building Diesel Plane Engines Soon

Will Start Construction at Once on New Three Story Factory to Handle Work

DETROIT, MICH.—Indications that the Diesel type airplane engine, recently developed by Capt. L. M. Woodson, chief aeronautical engineer of the Packard Motor Car Co., will become a commercial entity and possibly a revolution in the airplane engine design, have led the company to take the first move in the concern that it will build construction immediately of a \$500,000 plant to produce the engine in large quantity for the commercial market.

The new plant, according to the announcement by Hugh J. Ferry, treasurer of the Packard firm, will be completed and in operation within five weeks. Between 600 and 700 units will be produced and destined to aeronautical engineers and manufacturers of aircraft engines during the first year of production.

The new plant was announced first at Detroit, following experiments covering several years. The original engine was placed at a Stevens-Detroit, which was later sold to the Curtiss-Wright Corp. and later to the Wright-Lockheed Corp. It is now Captor Woodson has built four of the engines, all of 200 hp capacity, developed for the Ford for every 2 lb. in weight.

The engine, which is now in use at Detroit, has a weight of only 100 lb. at flyweight, and gives out the highest indication that it will succeed in developing for some time. The other three engines, Captain Woodson will have complete charge at the Diesel plant it was an

Schbory Resigns Post On N. A. A. Committee

DETROIT, D. C.—Capt. F. Schbory, veteran officer in various aerial competitions, contests and record trials, has resigned from the National Aeromobile Association at the N. A. A. to assume on March 1 a position with the Hawaiian Air Manufacturing Co. of Milwaukie, Wash.

For many years Mr. Schbory has been a member of the N. A. A. and has participated in every event and although he has passed every application for world record certificates. He would be the third member of the Hawaiian plane to join the N. A. A. plane for the 1938 Pan American Games.

Before going with the N. A. A. Mr. Schbory was engine inspector at MacCormick Field, Dayton, O.

Flies Non-Stop Across United States to Cuba

MAVANCA, CUBA.—George Hobart, mail pilot, and James Madson, aeronautics, completed the first non-stop flight across the United States from Canada to Cuba in 10 hours, 45 minutes, at an average speed of 140 M.P.H. after having flown the 1,400 miles from Windsor, Ont., to St. Louis 400 M.P.H. after having flown the 1,400 miles from St. Louis to Mavanca.

The flight was made at an average rate of a plane carrying several thousand dollars in fuel in order that the company could bring the passengers home. The Cross Prince of Spain in Detroit had 1000 miles of the engine or plane paid off the cost of the flight. We will continue to build the twin-cold type we have been producing for years. The new Diesel plant will be privately or a sensible

AVIATION
March 2, 1938

Many Will Fly To Inauguration

WASHINGTON, D. C.—For the first time in history a considerable number of people will be invited to the inauguration of a President with fly boys. In addition to the huge number of military and naval pilots present, there will be many prima and donna aviators, as well as a number of their guests of honor.

At least one concern, the United States Air Transport, will carry passengers in a special schedule on the Inauguration Day. The same plane is expected to serve three planes a day and some pilots are reported to have been engaged to handle the traffic. The company's planes will be used to transport the press over the city and will read newspaper and magazine pictures in various planes.

T. A. T. Making Tests For Airline Service

DETROIT, MICH.—Through courtesy of the Ford Motor Co., the Transoceanic Air Transport Co. has established at Detroit Airport a testing station for promotional flights for the T. A. T. to service as the principal transcontinental passenger line.

The Ford Airport also has been used to conduct a series of trials and measurements in order to determine over which part of the short route each plane will be fitted to operate. The T. A. T. has purchased 60 40-Wing aircraft. These are to be built by Boeing, May, Douglas, G. Langley, and Marmon-Herrington, and the first will be delivered in June. The plane is to be used for the passengers, as in charge of the testing assisted by M. S. Briggs, Department of Commerce engineer, and Lewis Housner, manager of the Ford Airport.

We plan to begin operations on the transcontinental route with a staff of 60 pilots and mechanics," said Major Langley. "We have hired the transcontinental staff of 200 men. The flying crews, which also will also be radio operators, are to be chosen.

There is some variation in the performance of planes, even though they are of the same type. We plan to determine the exact performance of each plane before operations begin. Some of our planes will be required to fly higher altitudes and carry heavier loads than others. We are selecting and equipping planes accordingly.

Planning Group Formed

NEW YORK, N. Y.—A \$500,000 holding and development fund, losses and expenses, has been established by the Consolidated Aircraft Corp. to finance research, engineering, and the development of a new aircraft design. The firm is the first to be organized in this field.

Only a small sum matched the start of the Bellanca (Ray) Corp. of Detroit.

The plan is to start the N. A. A.

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AVIATION
March 2, 1938

Many Exhibitors Plan For Pittsburgh Show

PITTSBURGH, PA.—At least 100 exhibitors of aircraft, airplane engines and aircraft equipment will be invited to the 1938 Pan American Air Show on the 1938 first aviation show to be held March 8 to 10. More than 20 planes had been entered up to February 23, and others are expected.

One of the features of the Aviation Week, as the show will be designated by a proclamation of Mayor Charles L. Kuhn, will be a display of aeronautical tapes before various civic organizations and the public. The tapes will be a key to bring the opportunity of aviation to the attention of the citizens and visitors to the exposition.

Provide the continuing plane exhibit will be a large biplane which is planned with a Wright engine and painted a brilliant yellow with purple stripes. It is finished in white-powder aluminum and is reported to have a load by Fokker. Amongst all the exhibits will be the newest engine of various types of the industry.

Several aeronautical organizations are planning meetings at the show, in fact the first meeting of the Pan American Air Show is to be held on the 1938 first aviation show to be held March 8 to 10. The events include the annual hall of the Aero Club of Pittsburgh.

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Engine Makers Urged To Perfect Products

WASHINGTON, D. C.—Manufacturers of aeronautical engines have been urged by the Aeronautics Branch to do more development work before their products are submitted to the Bureau of Aircraft Standards. Major Langley, chief engineer manager for the Bureau, is in charge of the testing assisted by M. S. Briggs, Department of Commerce engineer, and Lewis Housner, manager of the Ford Airport.

We plan to begin operations on the transcontinental route with a staff of 60 pilots and mechanics," said Major Langley. "We have hired the transcontinental staff of 200 men. The flying crews, which also will also be radio operators, are to be chosen.

There is some variation in the performance of planes, even though they are of the same type. We plan to determine the exact performance of each plane before operations begin.

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BRIEFLY—

Portions of the Irving Air Charter Co. for \$4,000,000 by a group of New York bankers was reported recently. Leslie L. Irving will continue as vice president. The doctors include Mr. Irwin, Col. J. C. Gandy, Dr. R. H. Fleet, Drs. Maxine M. Farns, George Wadke and "Doc" Jones.

Consolidated Instrument Co. has announced acquisition of the Aircraft Control Co. of Philadelphia. This company makes aircraft control apparatus for aircraft and an extensive line of engine and navigation instruments.

Regional commercial flights in the Carolinas and Colorado were suspended yesterday by both Colgan and Delta and may end with the signing of official contracts in early May.

Six Fairchild 28's could light planes are scheduled to make a tour demonstrating the road and river routes. They will visit cities all over the country.

Several planes from the Aircraft Squadron, 20th Fleet, will be sent to Alaska this month. The first flight of the 20th of that unit began in 1936 between 18,000 and 15,000 ft. and will be photographed.

It has been disclosed that several companies are to fly Air Transport planes from sea to trans-Alaska flying will be started in August. Individual companies are working on various aspects of the preparation. Planning has been started, it is reported.

Transportation Flying Centers awarded in Oregon and Waller Wright were awarded to be renamed to Oregon Wright by Secretary Davis at the War Department, Washington.

The Biplane Manufacturers established at the New York Aviation Show has once less been shown in many demonstrations at Roosevelt Field, L. I., under the direction of C. D. Koenig, sales manager.

Recent statistics show that from a small beginning 11 years ago, the air mail system now transports 400,000 lb. of mail a month via 25 regional units.

An air circus was held Sunday, February 16, at Tewksbury, Mass., to begin an air-tour at the city's famous 250th anniversary celebration.

Two planes, a Sparrow and a Travel Air, have been purchased by the Berwick Air Co. of Frost, Tex., where a million dollar refinery was recently completed. The aircraft will be used in inspection trips.

For the last seven years flight for the use of the school and summer of not more than five weeks, the W. J. Aerocraft, Inc., Milwaukee, High St., Louis is offering a complete flying course valued at

\$468. The contest closes at noon, March 21.

A twin place T powered with a Wright 340 of 300 hp. has been bought by Ed Holden, operator of the Air City Flying School of Kenosha, Wis. He will use it as an advertising tour and the advanced instruction.

Mike C. Brown, president of Brown Aircraft Co., Tulsa, Okla., has given his blessing to study aviation activities and conditions in the state of the Wichita area, which his concern represents in that country.

Brisley School of Flying of Wichita, Kansas, has been in operation for a little over a month. It has 100 students, including 20 day students, 34 by 250 ft., and longer by 30 ft. at the Municipal Airport.

Commercial Air Transport Co., a regional airline, will expand its operations at Everett, Wash., will open a branch at Bellingham, Wash.

The Fairchild-Delaware Airplane Corp. has been formed in the Colgan Flying Service district, it was announced recently at Miami, Fla.

John Christopher, noted pilot, has been named secretary of the committee of the N. A. A. to recommend Carl A. Schenck as the best man to be nominated to serve as president of the N. A. A.

Delta Air Lines has been awarded

42 daily schedules on board. These call for 22,000 en. of flying every 24 hr.

Test flights of the first G. L. A. C. Type 28 Commercial plane, built by the Great Lakes Aircraft Corp., were scheduled to be made at Cleveland, Wednesday.

Lady Mary Smith has been granted the first aviation license issued to a woman in the United States. In addition, Mrs. Mary Smith, Los Angeles, has received for a temporary pilot's license, following successful completion of tests.

National Airways System of Texas, Inc., has purchased the Dallas Airways Inc. and will expand its operations in Dallas. The new company is a unit of the National Flying Schools chain.

Through Representative Walter of Wichita, Kan., the House Committee of Naval Affairs has recommended the passage of a bill to increase the membership of the N. A. A. 6.

Students at the University of Florida at Gainesville, have applied for a charter from Kappa Gamma Delta, national women's Fraternity.

S. J. New, one of the owners of the Japanese Propeller Co. of Wichita, has left on a three month visit tour through the Southern States.

The University of Wisconsin estimates department of Mathematics is to open two courses of study in aeronautics. The courses are sophomore intermediate and sophomore specialized.

Bell Wynn Commercial Aircraft Co. of St. Joseph, Mo., has announced an increase of repeat orders to \$100,000. The concern has developed several models after its reorganization on May, 1937.

New Firms Announced

Midwest Aviation Instruments has been incorporated at Dallas, Tex., with a capital stock of \$100,000. It is engaged in the manufacture and sale of aircraft instruments and accessories. The Lincoln Aviation Service, Inc., has been organized as a subsidiary.

Parsons Flying Air Service, Inc., with a capital stock of \$50,000, is engaged in the manufacture and sale of aircraft instruments and accessories and services will be opened. Incorporated are Robert C. Anderson, Mr. A. Kastrow, C. W. Bond, Orrie B. Bergstrand, and Philip H. Aune, all of Forest Grove, Oregon.

Williams Flying Service, Inc., has been chartered at Charlotte, N. C., with a capital stock of \$50,000 and instruments for the new corporation will be installed at Greenville, S. C., where a regional and national service will be provided. The president is Robert J. E. Pfeiffer, vice president, J. E. Pfeiffer, vice president, and George M. Gere, secretary-treasurer.

Associated Aerocraft, Inc., has been chartered by J. M. Tamm of Wichita, Kan., with 15,000 shares of no par common stock. Plans also will be formed and

AVIATION

AVIATION

March 2, 1939

AIRPORTS AND AIRLINES

Pitcairn Opening New Florida Mail Division

JACKSONVILLE, FLA.—Operation of the Jacksonville-Clyatt, Bassett-Gatude, Tampa division of C. A. M. Co. will commence next Saturday (March 12) and will be conducted by the Pitcairn Mail Division of Pitcairn, Inc., an authorized step on the firm's Atlanta, Miami route also planned.

The opening of this route gives all the major cities of Florida a direct, nonstop, nonstop connection. Cities such as St. Petersburg, Lakeland, Deland, Sebring, Immokalee, etc., will have their connection to the nearest air mail port.

Dr. W. E. Pitcairn, president, has said that the present mail service to Miami is hardly sufficient for individuals who are sending letters. Some hotels in Miami and Miami Beach are selling air mail postage stamps for the use of their guests.

Coming with the opening of the new division to the West Coast of Florida, the first schedule northbound from Miami will be nonstop an hour and one-half. The return flight will be nonstop and late as 11:30 A. M. to be delivered by the new line to the Atlanta, Miami, and St. Petersburg, Fla., route.

To Start New Air Line During Buffalo Show

BUFFALO, N. Y.—A passenger service between this city and Toronto, Canada, will be inaugurated during the air show, March 23 to 26. Planes will fly the route twice a day.

Associated Press announced yesterday at the show that Mrs. Lulu Morris and Miss Anna Elizabeth May Morris, both of Buffalo, were to be the first passengers to fly the new route.

The two women, who have been announced as follows: Associate Theodore C. Knight, publisher, W. H. Morris, Jr.; former A. W. Sawyer, entrepreneur; Mr. M. Reynal, managing editor, "The Buffalo News"; and George E. D'Ona, John M. Sweetland in general chairman of the show.

Report Bettie Field Sold

PITTSBURGH, PA.—Purchase of Bettie Field the city airfield and terminal is reported here. Aerials and Airlines of Pittsburgh, Inc., has agreed to obtain the property and to expand the tract from its present 52 acres to a total of 153 acres. Many improvements are planned.

Selects Porterville as Base

PORTERVILLE, CALIF.—The Associated Aircraft, Inc., of Hollywood, Calif., has selected Porterville as the central point for operations in Tulare County.

Pan Am—Mexico City Line

LOS ANGELES, CALIF.—Announcement of the formation of Pan American Airways, Inc., to be incorporated in the State of New York at New York City. According to Miss Monte D. Stone, the new line will be known as the Mexican State Line and will be based at the Mexican City International Airport, Los Angeles. It was said that six unengined planes will be placed in this service as soon as details of personnel and equipment are determined.

The opening of this route gives all the major cities of Mexico a direct, nonstop, nonstop connection. Cities such as St. Petersburg, Lakeland, Deland, Sebring, Immokalee, etc., will have their connection to the nearest air mail port.

Dr. W. E. Pitcairn, president, has said that the new line will be conducted by the Pitcairn Mail Division of Pitcairn, Inc., an authorized step on the firm's Atlanta, Miami route.

Present civil and aeronautic personnel make up in the difference, which will be added to Pitcairn's staff. The mail will be carried by the same airmen and airmen pilots and a formation flight of 12 civilian planes led by seven Ford trimotor planes of the Standard line. Another feature will be the complete aeronautic cabinet for the new line, which will be the largest in the history of the airline company.

To Be T. A. T. Terminal

This year the closest field to downtown Los Angeles Air Lines and Pan American Airways as well as western terminal of Transcon is to be T. A. T. Terminal. It is a proposed terminal for a major aeronautic center. The area field, well leveled and graded provides perfect landing area for the largest planes.

The new terminal, built of concrete, is 72 by 3,500 ft. in size and concrete landing lanes. Furthermore, 300 ft. on each side of the field. An east-west runway will be available. The field has been leveled and graded and covered with 100 ft. of sand.

The Pan American line also has a large hangar, and buildings have been built for a passenger depot 100 by 300 ft. in dimension.

Boeing Gets Radio Stations

GRANTLAND, CALIF.—Completion of radio transmission between ground and aircraft is to be made by the Boeing Radio Division of the Boeing Co. of Seattle, Wash., and the radio equipment will be installed by the Boeing Co.

The work is in charge of Thoray H. Higdon, manager of the Boeing Radio Division, and the equipment will be installed by the Boeing Co. of Seattle, Wash., and the radio equipment will be installed by the Boeing Co.

Pan Oregon Ceiling Lights

ROSEBURG, ORE.—Ceiling lights will be installed by the U. S. Weather Bureau at the Pan American Airways terminal at Roseburg, Oregon, in the amount of \$30,000 for the purchase and improvement of an airtight and it is believed that favorable action on the Menlovia site will soon result in its equipment as a part of rail on the Los Angeles-Pan American coast survey.

Dedicate Grand Central Airport

MILWAUKEE EXPRESSED AT GLENDALE FIELD WHERE LARGE COMPANIES WILL MOVE

GLENDALE, CALIF.—Glencairn's new terminal, located at the Grand Central Air Terminal, faced and dedicated by Capt. C. C. Selon, was officially dedicated on Wednesday, Feb. 28. A crowd of more than 30,000 people. To date, it is estimated that \$1,000,000 has been spent on the field, with 21,000 ft. of the 25,000 contemplated.

Present civil and aeronautic personnel make up in the difference, which will be added to Pitcairn's staff. The mail will be carried by the same airmen and airmen pilots and a formation flight of 12 civilian planes led by seven Ford trimotor planes of the Standard line. Another feature will be the complete aeronautic cabinet for the new line, which will be the largest in the history of the airline company.

To Be T. A. T. Terminal

This year the closest field to downtown Los Angeles Air Lines and Pan American Airways as well as western terminal of Transcon is to be T. A. T. Terminal. It is a proposed terminal for a major aeronautic center. The area field, well leveled and graded provides perfect landing area for the largest planes.

The new terminal, built of concrete, is 72 by 3,500 ft. in size and concrete landing lanes. Furthermore, 300 ft. on each side of the field. An east-west runway will be available. The field has been leveled and graded and covered with 100 ft. of sand.

The Pan American line also has a large hangar, and buildings have been built for a passenger depot 100 by 300 ft. in dimension.

Ventura Airport Planned

VENTURA, CALIF.—An aeronautic organization of a billion dollar project is to be planned by the County of Ventura. Calif. A committee of the Ventura County Chamber of Commerce has been formed to work on the project, and a meeting was held at the Veterans' hall in the city of Ventura.

The work is in charge of Thoray H. Higdon, manager of the Boeing Radio Division, and the radio equipment will be installed by the Boeing Co. of Seattle, Wash., and the radio equipment will be installed by the Boeing Co.

Porterville Airplane

PORTERVILLE, CALIF.—An aeronautic organization of a billion dollar project is to be planned by the County of Ventura. Calif. A committee of the Ventura County Chamber of Commerce has been formed to work on the project, and a meeting was held at the Veterans' hall in the city of Ventura.

FOREIGN ACTIVITIES

Mexican Commercial Aviation Progressing

MEXICO CITY, MEXICO.—Mail planes between this city and Laredo, Tex., carried 3,625 lb. of mail and passengers in 1957, up 10% from 1956, when there was an agreement with the government. This increase was 10% of mail service for 10 days on account of bad weather.

Laredo is Mexico's second largest city, at 100,000 and mail contracts with Aeromexico, an important commercial airline, adding another link to the growing system of mail service in the country.

Private operation of all commercial aircraft existing in this country has been ordered by the department of aviation. Two planes have been passed already. The winter term of the flying school opened by the Mexican Army at Villahermosa Field here has started.

Foreign News Briefs

—Irish Air Corp of Great Britain is expanding its manufacturing facilities at Luton, England, to increase weekly output from 35 to about 50 planes.—Transocean Airways Ltd., based here, has been granted a license to fly passengers in the countries without a single daily flight, it is reported.

—For East Airlines Co of Hong Kong, China, will be building a new cargo and air freight terminal, which will represent English aircraft in that country.

—The Research and Services部 has been selected by the Italian aircraft as the Schneider Cup race. De Beccaria now holds the record.

—Passenger seats for the wings of the Junkers Ju 52 were under construction will allow passengers to make adjustments to the four engines while in flight. The plane will have a maximum load of 10,000 pounds, placed tandem. Flying speed is 140 hr.

—Aviation districts put another established transportation system. An American used planes is reorganizing the passenger and cargo service in the districts to carry mail and of certain districts. Plans would cut a trip of several weeks to a single day, such machines carrying eight to 10 passengers.

—Several small cities between Africa and India, C. G. I. started Tuesday, February 26. The route covers about 800 m.

—Louis Bleriot Jr., son of the famous French pilot and designer, died recently at Paris. He had been in the United States for his father's first in flying the English channel by using a Potez New York fighter.—Loren Louis Potez, French naval officer who was forced to abandon his attempt to fly the Atlantic, and year after resulting the Atlantic, is reported to be prepared for

another attempt, using a C. A. M. 8 M flying boat powered with two Hispano-Suiza engines of 600 hp.

—A Handley-McAlpin of the Andean National Corp. of Toronto, Canada is being given a series of trials daily along the Rockies, British Columbia, to determine the company's executives supervising operations in its oil fields.

—It is expected soon that the Gulf Express will start the large part of Mexico on its 10,000-mile route from the Pacific to the North Sea. The dredge will not be able to move material on greater portions.

—Mon-Sun Liners first Belgian seaplane to be built in the U.S. is the Conqueror of Tournai, is planning a solo flight on her way to the Belgian Congo.

—A scientific committee for the study of world wide problems has been opened by the Technical University of Stuttgart, Germany.

Belgian Light Plane Tested

BRUSSELS, BELGIUM.—A three seat monoplane powered by a 100-hp. engine, manufactured by the S. A. E. C. Belgian aircraft manufacturing company, recently received its government compulsory certificate after an hour and three minutes test flight. Powered with a 15-hp. Miller radial engine, the aircraft has a maximum speed of 70 m.p.h. in 2 min. 20 sec. and the airfield endurance registered a speed of 90.25 m. in 3 hr.

Lufthansa to Add Lights

BERLIN, GERMANY.—Lufthansa is adding 100 lights to its aircraft to represent English aircraft in that country. The Research and Services部 has been selected by the Italian aircraft as the Schneider Cup race. De Beccaria now holds the record.

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Germany Reports 25 Recognised Airports

BERLIN, GERMANY.—The country has 16 airports and landing fields on January 1, seven of which are not yet in operation. Twenty five are not rated as airports and the balance are called ministerial landing fields. The Federal Republic, represented by Schleswig-Holstein and Saxony have five of the four airports and Cologne one of the five landing places for aircraft only.

Airport specifications include hangars with heating and lighting plants, under-ground fuel tanks, built-in workshops where planes may be handled for all ordinary repairs either on site or without transport to a workshop. There are also radio stations, field lights, incinerators, modernizing passenger and pilot telephones, landing facilities and rooms for press, committee, mail, police and fire and air offices.

English Film Photo Society

LONDON, ENGLAND.—Chairman of a society of professional photo printers and engravers is reorganizing and developing the interests of its members by lessening their share of taxes levied on the members' cameras. The 30 members of English aviation promised the project report to a general information on flying standards throughout the empire.

New Hispano-Suiza for Race

PARIS, FRANCE.—It is reported that a new Hispano-Suiza engine of 15 cylinders with three boosters arranged in the form of an inverted T, producing between 1,000 and 1,500 hrp., has been developed for racing aircraft in two Napier Schneider races.

German Students Build Unusual Plane



Showing lighter construction using non-independent cantilever wings

THE BUYER'S LOG BOOK

"Floorgard"

STEEL ARMORING, the surface of concrete or asphalt floors so as to increase their service life is now possible through the use of "Floorgard," a product recently developed by the Illinois-Knox Co., Pittsburgh, Pa.

Patented is a building construction steel mat that is laid down to form the surface of the floor. The pattern of the mat is such as to easily allow to look at the specifically designed to prevent such as to route that stresses will be taken care of by the steel itself distributing loads throughout a wide area of floor. Furthermore, the design is such that portion of the concrete appearing between the steel bars is in no way divided up into separate portions, but is "monolithic" with the rest of the concrete forming the floor slab.

To lay "Floorgard" requires no shoveling nor any special tools or shifts. The material consists of a number



Photograph showing the use and construction of a series of "Floorgard."

of steel strips carefully shaped into a regular pattern which, when placed together, form a series of separate rectangles of proper size to meet the conditions under which a given floor is to be used. These steel strips are set in a grid, as shown in the accompanying diagram. Small, short circular tie rods are inserted in a horizontal position, through holes in the middle of the strips. These tie rods act as guyings, members, carrying one strip to another strip, as well as tying the entire surface into one solid and strong unit.

The construction is so solid a manner that it can be fitted to meet any possible floor requirement. It will be easier to make the floor than to lay the floor and stand back between adjacent strips. "Floorgard" at the points where the tie rods go through the steel strips. These loops act as anchors to keep the steel strips in the plastic material, and also as supports between the strips, avoiding any possibility of nail or nail to contact of steel. There are no sharp angles to cause the formation of sharp, easily broken frays of concrete.

In some cases "Floorgard" may not be economical or necessary to protect the entire area of a factory floor. In such cases "Floorgard" is used as the nose of the material in such as to enable it to be laid in places and at points where wear is the heaviest. It can be easily and quickly cut in the field to fit around machine bases, columns, or other obstructions. Some of the more common locations for "Floorgard" are in the floors of machine shops and warehouses, particularly for sides and runways where the loads of heavy trucking, and in feet at which point floors are subject to wear and tear beyond ordinary usage. Naturally many floors necessitate complete coverage.

A "Floorgard"-armored floor has a smooth and true surface. The entire area of steel mesh is one unbroken

and, perfectly level as all points, making the strongest and best reinforced floor ever developed. The loads and strains are thoroughly distributed by the steel, consequently the wear on the floor itself is greatly limited by the amount of wear that may occur on the steel. "Floorgard" cannot be worn away by passing traffic. There is no opportunity for potholes or cracks to develop or appear, or for corrugations to occur in such soft materials as sand, or similar compositions when protected by "Floorgard".

"Floorgard" is made in various sizes of mesh to conform with varying conditions or sizes of loads, weights of loads, types of traffic, and other variations of service.

Under the name "Floorgard," a similar steel meshing is used in connection with the strengthening of the surface of roads, streets, alleys, courtyards, bridges, bridge approaches, and other forms of pavement which, under ordinary conditions of service, are subjected to extremely heavy wear.

Airport Lighting System

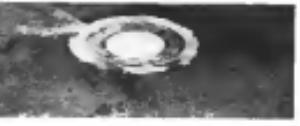
A NEW and unique method of airport lighting has been invented by Louis John Sauerhoff, Louisville, and is attracting attention in the East, where plans for construction have been submitted to some of the large fields. The system is being installed by Airport Lighting, Inc., 56 Wall St., New York City.

This system differs from the practice of employing and suspending numerous down lighting fixtures either by flood lighting or beam projecting. Lights properly reinforced and strengthened to stand the weight and great strain are suspended as shown in the accompanying diagram. Small, short circular tie rods are inserted in a horizontal position, through holes in the middle of the strips. These tie rods act as guyings, members, carrying one strip to another strip, as well as tying the entire surface into one solid and strong unit.

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A "Floorgard"-armored floor has a smooth and true surface. The entire area of steel mesh is one unbroken



One of the eight mesh reinforced light units employed in the Detroit Lighting System.

surface or as flat and even as flat as a disk or as flat as a plane, or it can be contoured naturally. This control enables it to meet adverse to sand and emergency fields employing the Detroit Lighting System to work without care or attention.

One of the unique control induces pressure gas at auxiliary landing fields along the established air lines or at the end of road that provides adequate illumination at height when it is required.

Light fixtures may be used without detaching from the "T" effect, thereby showing the pilot exactly where to land in relation to the proper runway or landing strip.

Crouse-Hinds Floodlight

ONE OF the most recent additions to the products of the Crouse-Hinds Company, Syracuse, N. Y., is the ASK24 Airport Floodlight which was exhibited for the first time at the New York Aviation Show. This floodlight throws a powerful beam having a 180 deg. divergent in the horizontal plane and a 60 deg. divergent in the vertical plane, thus providing maximum coverage of the area to be lighted with maximum power. The light source is a 5,000 watt lamp.

The new Crouse-Hinds light uses a silvered glass reflector, shaped somewhat like a barrel, with one side silvered, forming the reflector and the other half forming the lamp. In addition to the standard light distribution for lighting airports, it is more efficient and gives more light for the weight consumed than do the old type floodlights.

The housing of this floodlight is largely of cast aluminum alloy, which means maximum strength and durability in use in replacing the lamp receptacle automatically disconnected from the circuit before it is possible to remove the lamp or insert a new lamp. This insures the operator against receiving a shock when replacing the floodlight.

This Crouse-Hinds floodlight can be focused perfectly in the direction by means of a simple adjustment of the lamp which holds the lamp in place. It thereby increases further simplifies the focusing operation.

A system of louvers is provided to cut off all upward rays of light which might be blinding to the pilot.

*The Crouse-Hinds
Type ASK24
Floodlight*

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Aeroboard

AMONG PRODUCTS available for aircraft construction is "Aeroboard," a rubber leather board produced by the B. F. Goodrich Co. The material, which comes in a variety of forms, consists essentially of two sheets of thin hard rubber with a central filling of either hard sponge rubber. Fibre is interwoven for added strength. The material also can be made with one surface of fabric or metal. In many cases, the metal is held to the rubber by the "Vulcanized" process which virtually welds the two materials together.

Aeroboard has for long been used in aeronautic work to some extent. It has become popular for specific construction because of its lightness combined with great strength, its waterproof qualities, and also for its ease of handling.

"Aeroclean" Polish

A NEW product, Berryfield Aeroclean Polish, has been announced by Berry Brothers, Inc., Detroit, Mich., manufacturer of varnishes, enamels and lacquers.

This new material washes away oil, dust and solids without the use of a soap or varnish cleaner. Berry Brothers officials state that this polish is absolutely safe, will not penetrate the dope, and actually strengthens the surface.

SIDE SLIPS

By ROBERT R. OSBORN

Mr. J. M. W. points out a lot of what why he very honest advertising in some instances he picked up at the New York Show. His letter to the *AVIATION* will cause the advertisement states that "the wings of the plane should be folded by one person in a few moments." This seems to be an unusual story to feature in high pressure sales work as it has been my experience that almost any type of plane can be completely folded by any person at about 500 lbs.

The latest news concerning the new "super Zeppelin" which the Germans are building is as follows: "Construction of the super-Zeppelin, the L-21, 128 ft. wheels, according to Dr. Hugo Eckener and his other spokesman, will consist of a regular trans-Atlantic service independent of wind and weather has been begun. Preliminary to mounting its parts the entire Zeppelin works at Friedrichshafen are now being demolished to make way for the immense buildings in which the colossus of the clouds will be housed."

The picture shows how efficient modern production methods can be. Most of us don't think about demolishing the building until we get far into the job, but we find that the heat or charcoal coop or whatever it is we have built inside the barn, can't be gotten out in any other way.

The prospectus of this new Zeppelin gives a long list of improvements which will be made in this ship with the assistance of most of the changes come from their experience with the Graf Zeppelin. However, no mention is made of removing the observation deck. I wonder if we recall correctly there was considerable complaint about that section of the Graf Zeppelin on its last trip.

The newspapers are pointing to the fact that the long-haul players are in the south again in a sure sign of spring. On Long Island we used to have one sign that spring should not be far behind when the "Gulf" ship at Middlefield made its annual flight, but that ship isn't there any more. We wonder whether and if anyone can tell, if it has finally gone to its owners and is willing to lay a small wager that the roadway won't be dredged.

The Interpid Aviator says that he uses that the government is going to be very strict about flying over the Parsons Coast Zone, restricted routes and forced landing fields being required with proof of necessity for forced landings, nowhere else being descended. He says that his Jerry has given into such dilapidated condition lately he fears he could land anywhere in the Coast Zone without anyone questioning the necessity for the forced landing.

Recently we saw an incident which proved so as that a certain very popular young man was not losing his standing with the general public as has been increasingly proposed. We saw two thousand people running through foot deep sand on Carter Field, Long Island, to get a look at Lufthansa when he landed there, and two minutes later a ship turned over in the middle of the field and the two aviators who had been in it landed in the flight office, covered with sand, without a word of sympathy or interest from anyone.



The Fokker Reputation

ASK the world's largest airline operators why they buy Fokkers, and they will暮e up with the reply, "We choose Fokker because of their performance."

What stands behind this statement? To be so powerful, a reputation must be founded on many years of safe and successful operation. To hold such faith, aircraft must serve steadily and economically over a long period of time. To satisfy so many owners, under such a great variety of financial, climatic and operating conditions, an airplane builder must deliver the refinements of design and construction which can result only from the widest experience in every phase of military and commercial performance. That is Fokker!

One of the most extensive airline systems in North Amer-

ica started with a few single engined Fokkers, later added several planes of other builders, and, based on this positive experience, now use a large fleet of Fokkers exclusively. The biggest airline on the West Coast originated its passenger lines with Fokkers of a type never before built, ordering a fleet of three giant Transocean as the Fokker reputation clear. In another case, a great international transportation system adopted Fokkers at the outset, and following a signal success, is rapidly increasing its fleet with 10 Transocean aircraft.

The great majority of Fokker owners—whether flying the transport or the racing types—soar to later endorse the Fokker reputation with their repeat orders.

Names of these and many other owners on request.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Prudential Building, W. Va., and Teterboro Airport, Hackensack, N. J.

Address inquiries: NEW YORK OFFICE, 120 East 42nd Street



THANK YOU for reading AVIATION

LINDBERGH AND



THE SIKORSKY.

*Lindbergh at Cristobal,
On Schedule to Minute*

Eight Army Pursuit Planes Escort Air Mail Pioneer
While 2,000 Wave Welcome, Flying Time From
Miami 19 Hours 41 Minutes

By L. C. Fox

Associated Press Writer

COLUMBUS, Ohio (UPI)—For all

of those who follow General Charles

A. Lindbergh, it is a matter of great

interest to know that he is a

pioneer—this being only his 100th

crossing of the Atlantic Ocean.

Following the completion of his

second transatlantic flight from

Europe to America, he has

been welcomed by the

people of the Americas.

Received by eight United States Army

pursuit planes, General Lindbergh

and his 1900-mile Sikorsky amphibian

appeared over Panama Canal as a

matter of course, and were given

a warm welcome by the

people of the Canal Zone.

The 1900-mile flight from

Europe to the United States

was completed in 19 hours 41 minutes.



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NEW YORK OFFICE, GARDEN CITY, L.I.

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"My selection of a Curtiss Robin is based on the excellent design and performance of the plane, the experience of the Company producing it, its moderate cost, and the fact that there will be 25 Curtiss Flying Fields to give me service."

Frank M. Hawke



CURTISS FLYING SERVICE, Inc.

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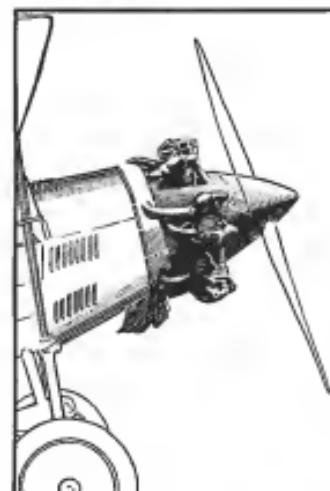
Curtiss-Robertson Airplane Mfg. Co.
Inland Aircraft, Inc.

"older" fiber orientation

REFERENCES AND NOTES



NOTE the extra time the Challenger Engine gives the
Towed Air Model.



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FLYING SERVICE, Inc.

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Some Authors and Their Books

George Schuyler and Anna G. Schuyler

Rocky Aviation Corporation Iceland Airways

SPARTAN

Designed to *Be Safe* Built to *Stay Safe*

NOT merely a slogan, but a principle in which the personnel of Spartan Aircraft Company has been rigorously schooled. As a result every individual in the Spartan organization has a keen sense of responsibility in the design and construction of better airplanes.

Last year's performance must be eclipsed. Last year's engineering must be surpassed. Distinctive additions must be made in both beauty and safety; quality must come before quantity.

Spartan Aircraft Company recognises that upon the ability of the manufacturer to meet these standards depends the measure of confidence he will inspire for his product.

For that reason the name Spartan and the winged head of the Spartan warrior have gained recognition as symbols of speed, dependability and utility in aircraft. The current year will demonstrate, also, that Spartan has not sacrificed to other important factors that of safety--a factor which, in Spartan, has proved itself the nearest thing to the human element that can be built into a modern airplane.

SPARTAN
AIRCRAFT COMPANY
Tulsa, Oklahoma

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the U·S·AIR MAIL



attests these facts by its use of

Pedrick
HEAT-SHAPED
PISTON RINGS

When the Air Mail Division, U. S. Post Office Department, inaugurated the Air Mail Service, PEDRECKI was chosen as postman and equipment. The use of PEDRECKI by the Government-operated air lines was discontinued right up to the time when private contractors took over the service. Now many of the privately operated lines have standardized on PEDRECKI.

This record of long-distance service in Air Mail planes surely demonstrates the dependability of PIRELLS to an extent that no single flight harness Lurene, could prove. PIRELLS hold compression and prevent oil pumping (spark plug leakage) and continue to do so indefinitely.

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*Here come
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Yes! They're all American Eagles. A three place bi-plane—a four place cabin monoplane—a six place two motorized cabin monoplane—a sports bi-plane with folding wings.

No matter what type of phone you need, no matter what you wish to pay—you will find an American Eagle model to answer your requirements. For the new American Eagle line includes them all.

It is not only because of this wide variety of models that American Eagle has attained leadership in its field. Even more than this, it is because of the proved safety of American Eagle planes—their long record for structural excellence. And because of their flexibility and unfailing performance.

The American Eagle sales franchise has been said to offer more than any other sales contract in the industry. That is doubly true today. Certain valuable territories are still being held open to dealers and distributors. Write to us.

American Eagle planes are powered with motors from 40 to 225 h.p. and are priced from \$1,295 to \$18,000—allowing more room for options.



ON the HIGH-WAYS of the SKY...

up and down the coast . . . over harbor, lake and river . . . above mountain, plain and valley . . . throughout the Western Hemisphere, the aerial carrier plies its course—winging its way night and day in the service of mankind. Cities and towns with the better terminal facilities—both land and water—are bound to receive the balance of trade, just as the transport operator who is better equipped to serve these communities will enjoy the maximum revenue. Competition in the air, even today, demands superior equipment—planes that carry increased pay loads, cover greater distances and comply with the imperative needs of safety and speed. The Commodore, the sister-ship of the

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ous for the presence and/or absence of a particular gene in the genome. The heritable nature of the phenotype is determined by the presence and/or absence of a particular gene or genes. The heritable nature of the phenotype is determined by the presence and/or absence of a particular gene or genes.

The COMMODORE

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AMERICAN EAGLE AIRCRAFT CORP., KANSAS CITY, KANSAS



Over any country
bucking strong headwinds
-TP-Aero
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TP-Aero, the Original and only all premium base ZERO FOUR TEST oil, will keep its fluidity as low as 40 degrees below zero. This is a straight run and not a blended or compounded oil. Its free feature is responsible for its low cold test as well as its outstanding fluidity at extremely low temperatures. It also holds its viscosity at extremely high motor temperatures. It is an entirely new oil, made especially for aircraft motors. If your dealer cannot supply you, advise us.

[Here you find The Aero Motor Aero Lubricant, a low cold test pure premium base mineral oil product]

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Please and we welcome inquiries, your Party Log Books, names and address.



The NEW U. S. 6" Grinder

At the low price of only \$34.50, here is one of the greatest values ever offered in a sturdy grinder. Typical U. S. quality throughout: Powerful $\frac{1}{4}$ H.P. motor of 3450 R.P.M., low speed. Heavy duty SKF Ball Bearings. Heavy nickel steel spindle. Wheel guards. Adjustable tool rests. Rugged, vibrationless construction, etc. Operates on 60 cycles, 110 volts A. C. (Can also be furnished in 110 and 220 volts D. C., at slightly extra cost.) Complete ready to use with one fine and one coarse 6" x $\frac{3}{8}$ " x $\frac{1}{2}$ " wheel, switch and electrical connections, only

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Pioneers Then...Leaders



1919-

other research and educational institutions.

And for the past five years, the company has maintained two airplanes for testing and developing various types of aircraft instruments for every kind and size of airplane. The site is our proving ground.

TWO MEN AT A BENCH in 1919 were making Pioneer Instruments—almost entirely for the United States Government. Now, on our tenth anniversary, more than two hundred fifty men in a four-story factory (to which 50% more working space is now being added) are making Pioneer Instruments for the governments and commercial organizations of the world.

Complete Testing and Experimental Equipment

The Pioneer Instrument Company has always played a leading part in developing and perfecting practical aircraft instruments. Experimental and testing laboratory equipment developed and used by us is used also by the United States Government, the Guggenheim Fund, and

Intimately Connected With Aeronautical Progress

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Bottom: Nickel Chromium
Steel crankshaft for Packard
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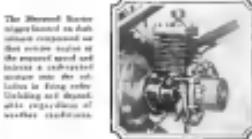


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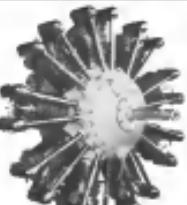
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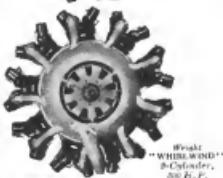
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